



Health Care Workers' Ability and Willingness to Report to Duty During Catastrophic Disasters

K. Qureshi, R. R. M. Gershon, M. F. Sherman, T. Straub,
E. Gebbie, M. McCollum, M. J. Erwin, and S. S. Morse

ABSTRACT *Catastrophic disasters create surge capacity needs for health care systems. This is especially true in the urban setting because the high population density and reliance on complex urban infrastructures (e.g., mass transit systems and high rise buildings) could adversely affect the ability to meet surge capacity needs. To better understand responsiveness in this setting, we conducted a survey of health care workers (HCWs) (N=6,428) from 47 health care facilities in New York City and the surrounding metropolitan region to determine their ability and willingness to report to work during various catastrophic events. A range of facility types and sizes were represented in the sample. Results indicate that HCWs were most able to report to work for a mass casualty incident (MCI) (83%), environmental disaster (81%), and chemical event (71%) and least able to report during a smallpox epidemic (69%), radiological event (64%), sudden acute respiratory distress syndrome (SARS) outbreak (64%), or severe snow storm (49%). In terms of willingness, HCWs were most willing to report during a snow storm (80%), MCI (86%), and environmental disaster (84%) and least willing during a SARS outbreak (48%), radiological event (57%), smallpox epidemic (61%), and chemical event (68%). Barriers to ability included transportation problems, child care, eldercare, and pet care obligations. Barriers to willingness included fear and concern for family and self and personal health problems. The findings were consistent for all types of facilities. Importantly, many of the barriers identified are amenable to interventions.*

KEYWORDS *Ability, Disaster, Emergency, Health care workers, Willingness.*

INTRODUCTION

In the United States, the health care community routinely responds to many types of disasters. For most of these, there is usually no shortage of staff, and for some incidents, hospitals frequently report that too many staff actually respond. However, little is known about how staff will respond to catastrophic events involving weapons of mass destruction (WMD) or naturally occurring virulent infectious disease outbreaks. Recent data from the sudden acute respiratory distress syndrome (SARS) outbreaks suggest that for these types of events, health care workers (HCWs) might be reluctant to report to work. Such reluctance could negatively affect the ability of the health care system to meet surge capacity needs.¹⁻³ This issue is of particular concern in the urban setting because the density of the population could facilitate

Drs. Qureshi, Gershon, and Morse, Mr. Gebbie, Mr. McCollum, and Ms. Erwin are with the Mailman School of Public Health, Columbia University, New York, New York; Ms. Straub is with the Greater New York Hospital Association, New York, New York; and Dr. Sherman is with the Loyola College, Baltimore, Maryland.

Correspondence: Kristine Qureshi, School of Nursing, Adelphi University, 1 South Avenue, Garden City, NY 11530. (E-mail: qureshi@adelphi.edu)

rapid spread of an epidemic or result in a large number of casualties in the event of a WMD event. Although we might assume that HCWs have an obligation to respond to these high impact events, this assumption might be challenged. For example, during Hurricane Francis in 2004, 25 nurses were fired or suspended for leaving early or not reporting to work during that event.⁴ As Singer et al.⁵ aptly point out, "Healthcare providers need to strike a balance between fear for their own personal safety and their duty to provide care to the sick."

Several studies have examined this issue; for instance, Shapira et al.⁶ evaluated the willingness of Israeli HCWs to report to work after an unconventional missile attack. They found that although 42% of respondents were willing to report to work, the percentage would increase to 86% if personal safety measures were provided.⁶ They also noted that both gender (female) and childcare responsibilities negatively correlated with reported willingness of staff to report to work. Another study, which examined Hawaiian physicians' and nurses' self-reported level of commitment to work in field facilities for WMD incidents or large-scale natural disasters, found wide variation in commitment depending upon the type of event.⁷ Respondents were far more willing to report to duty for natural disasters compared with WMD incidents, and overall willingness to report correlated with respondents' sense of their ability to provide adequate care to the victims. Finally, in a survey of 50 New York City (NYC) public health nurses, Qureshi et al.⁸ identified child care, transportation, pet care, and personal health issues as significant barriers to their ability to report to work during a disaster.

To date, no study has simultaneously evaluated the concepts of both *ability* and *willingness* of HCWs to report to work during catastrophic events. We propose that there is a distinct difference between these two concepts; ability refers to the capability of the individual to report to work, whereas willingness refers to a personal decision to report to work. Factors that might potentially influence HCWs ability to report include proximity of home to place of employment, child or eldercare responsibilities, and financial concerns. And although willingness might be influenced by ability (e.g., presence or absence of facilitators or barriers), even if one is fully *able*, he or she might still not be *willing* to report to work for any number of reasons.

The purpose of this study was to assess the ability and willingness of HCWs in the NYC metropolitan region to report to work during different types of catastrophic events. Staff from the Columbia University Center for Public Health Preparedness at the Mailman School of Public Health (the "Columbia Center") partnered with the Greater New York Hospital Association (GNYHA) to conduct a survey of HCWs from hospitals, community health centers, and long-term care facilities.

METHODS

The entire 200 organization membership of GNYHA was queried regarding interest in participating in the survey, and 47 facilities expressed interest. After the research team contacted each interested facility and provided them with a detailed explanation of the survey methods, all 47 agreed to participate. Each participating facility was then asked to appoint a site leader who would be responsible for administering the anonymous survey at their facility. Surveys were distributed to a convenience sample of employees, roughly proportionate to occupational category, across day, evening, and night shifts. Completed surveys were returned in a sealed

envelope to the Columbia Center where data were then collated and analyzed. (Please contact the corresponding author for copies of the survey and administration details.)

The Columbia University Institutional Review Board reviewed the study procedures, and a written consent exemption was granted for the survey.

The 23-item survey was designed to address the following: (1) demographics, (2) ability and willingness to report to work during different types of catastrophic events, (3) barriers to ability and willingness, and (4) fears and concerns about becoming ill or injured while reporting during chemical and bioterrorism events. Seven hypothetical catastrophic event scenarios were described, including severe weather, smallpox outbreak, chemical terrorist attack, environmental disaster, mass casualty incident (MCI), radioactive “dirty” bomb attack, and SARS outbreak. Events were described using landmark locations that would likely be familiar to the respondent. The scenarios for NYC participating facilities are described in Table 1. Respondents were asked about their ability and willingness to report to work for each of the scenarios using the following categories: “willing,” “not willing,” or “not sure” and “able,” “not able,” or “not sure.”

Analysis

Participating facilities were sorted by agency type, and hospitals were further sorted by size and teaching status. Respondents were characterized demographically (e.g., occupational category, age, and gender). The frequency of ability and willingness responses were calculated for each event type. An overall *ability and willingness score* was created; for each scenario, one point was given for each positive ability and willingness response. This was then dichotomized at the median for further statistical analysis. All analyses were performed using SPSS 12.0 (SPSS, Chicago, Illinois). Odds ratios (OR) and their 95% confidence intervals (95% CI) were estimated to assess the relationship between the predictor and outcome variables. Logistic regression models were developed to examine the relationship between job status and ability and willingness to report to work while controlling for age, gender,

TABLE 1. Catastrophic disaster scenarios used for facilities in and around New York City (NYC)

Type of event	Scenario
Weather emergency	Snow storm with 36 inches of snow in a 24-hour period occurs where you live
Bioterrorism	Smallpox outbreak in borough of Queens. Two hundred patients admitted to 10 hospitals
Chemical terrorism	Chemical terrorism attack in Penn Station with 5,000 victims brought to hospitals throughout NYC
Mass casualty incident	Explosion in Yankee stadium with 2,000 seriously injured brought to hospitals in the Bronx
Environmental disaster	Fire in Staten Island Fresh Kills Landfill. Thousand nearby residents with smoke inhalation. Wind blowing toward Brooklyn. Emergency rooms overwhelmed with asthma cases
Radiation terrorism	Radioactive bomb explodes in Kings Plaza Mall in Brooklyn. Thousands of people flocking to emergency rooms in NYC, LI, and Westchester
Untreatable infectious diseases outbreak	Outbreak of 15 cases of SARS in the facility in which you work

childcare, and eldercare obligations. A P value=.05 was used to determine statistical significance.

RESULTS

Response

A convenience sample of 6,428 health care employees from the 47 participating facilities completed and returned the survey.

Facility Demographics

The 47 health care facilities included 31 hospitals, 11 long-term care facilities, and 5 community health centers. Two thirds of the facilities were located in one of the five boroughs of NYC ($n=32$) and one third were located in the surrounding suburbs ($n=15$). The 31 hospitals were distributed almost equally by bed size: small (<225 beds, $n=11$), medium (225–600 beds, $n=11$), and large (>600 beds, $n=9$). A large number ($n=25$, 81%) of participating hospitals were teaching facilities.

Health Care Employee Demographics

A large majority of the respondents were full-time employees (88.0%), working on the day shift (80.1%), most were female (69.4%), and nearly half (42.7%) were 45 years or older. Participants were experienced, with an average of 10 years of employment at their current facility. The largest proportion of respondents were nurses (26.2%) and support staff (24.8%), followed by administrators (19.3%), other professionals (11.2%), and physicians (10.0%) (Table 2). The demographic profile of the respondents was similar across the participating facilities and to the workforce, in general, of GNYHA's member facilities.

Personal Obligations

More than half of the respondents (53.0%) reported that they had childcare responsibilities, and almost two thirds of these children (63.4%) were under the age of 13. A substantial proportion (27.1%) reported that they had eldercare obligations at home, and 29.6% reported that they had a spouse who was also expected to report to work during a disaster.

Availability for Additional Shifts or in Other Hospitals

Survey participants were asked about their availability to work additional shifts or to report to other facilities in the event of a disaster. More than half (54.0%) reported that they were available to work extra day shifts, 24.8% evening shifts, only 6.2% would work additional night shifts, and 15.0% reported that they could not work any additional shifts. Although a large percentage of respondents (79.1%) reported that they would be willing to work in another facility during a disaster, that percentage dropped markedly as the distance from home to the facility increased, 69.7% reported willingness to work at a facility close to where they live, 55.1% were willing if it was close to where they worked, whereas 25.5% would be willing to work in another county, and only 17.5% would work in another state.

Concerns for Personal Safety

More than half of the respondents reported moderate or high levels of concern about a terrorist-related workplace exposure to a chemical or bioterrorist agent. This was consistent across all facility types (Table 3).

TABLE 2. Respondent demographics

	N = 6,428	Valid %
Employee status		
Full-time	5,474	88.0
Part-time	523	8.4
Per diem	223	3.6
Shift (primary)		
Day	4,889	80.1
Evening	502	8.2
Night	166	2.7
Other	551	9.0
Gender		
Female	4,374	69.4
Male	1,926	31.6
Age group		
18–30	1,036	16.5
31–44	2,435	38.7
45–64	2,688	42.7
65+	133	2.1
Years in health (all/at facility)		
Mean	15.0/9.5	
Median	14.0/6.0	
SD	10.3/8.9	
Occupational category*		
Nurse	1,639	26.2
Support staff†	1,552	24.8
Administration	1,208	19.3
Other professional	698	11.2
Physician‡	630	10.0
Other§	326	5.2
Other clinical (nonprofessional)	150	2.4
Emergency medical technician	56	0.9

*For some categories, numbers do not add to 6,428 due to missing responses.

†Includes nursing assistants and other clinical and technical support staff.

‡Includes house staff and attending physicians.

§Includes all other occupations not included in the list above.

TABLE 3. Level of concern for personal safety for self during response to biological or chemical incident

Level of concern	Biological event [n (%)]	Chemical event [n (%)]
High/moderate	3,298 (54.7)	3,168 (52.5)
Slight/low	2,736 (45.3)	2,870 (47.5)

Health Care Employees' Ability and Willingness to Report by Catastrophic Disaster Type

For all facility types, there was marked variation in HCWs ability and willingness to report to duty by type of event, although there was little difference in responses across the different facility types.

Ability A greater proportion reported *ability* to report during an MCI (82.5%), environmental disaster (80.6%), or chemical incident (71.0), whereas fewer indicated ability to report during a smallpox (68.6%), radiation (63.8%), SARS (63.5%), or snow storm (48.9%) event.

Willingness Employees were more *willing* to report during a snow storm (80.4%), MCI (85.7%), and environmental disaster (84.2%) event and less willing to report during a SARS (48.4%), radiation (57.3%), smallpox (61.1%), or chemical (67.7%) event.

Interestingly, almost 20% of respondents were not sure of their ability or willingness to report during a catastrophic disaster. The highest degree of uncertainty was for smallpox, radiation, and SARS events. Table 4 summarizes the findings for ability and willingness for each event type.

Barriers to Ability and Willingness

Respondents were asked to indicate the reasons why they would *not be able* to report to work during a catastrophic event. The most frequently reported reasons were transportation issues (33.4%), childcare (29.1%), personal health concerns (14.9%), eldercare responsibilities (10.7%), pet care (7.8%), and second job obligations (2.5%). Again, the frequency and order of these reasons was consistent across all facility types.

Respondents were also asked about reasons for *not being willing* to report to work during a catastrophic event. Not surprisingly, fear and concern for family (47.1%) and self (31.1%) were the most frequently cited reasons, followed by personal health problems (13.5%) and child or eldercare issues (1.4%). The reported barriers to willingness were also consistent across all facility types (Table 5).

Correlates of Ability to Report

The following factors were found to *lower* the likelihood of respondents' *ability* to report to duty during a catastrophic disaster ($P < .05$) for most types of events: female gender, childcare, or eldercare obligations, personal health issues, and lack of transportation if mass transit was not operating. Interestingly, for all event types, marriage to a first responder *increased* the likelihood of being *able* to report to duty ($P < .05$).

Correlates of Willingness to Report to Work During Catastrophic Disasters The following factors were found to *lower* the likelihood of being *willing* to report to duty during a catastrophic disaster ($P < .05$) for most types of events: female gender, childcare, and eldercare obligations. Interestingly, as we found with ability, for all event types, marriage to a first responder increased the likelihood of being *willing* to report to duty ($P \leq .05$).

Multivariate Analysis After controlling for age, gender, childcare, and eldercare obligations, physicians and emergency medical technicians (EMTs) were significantly more likely to be *both* able and willing to report to duty during a catastrophic event. This held true for all types of facilities and events and for the overall composite score. Compared with physicians and EMTs, administrators, nurses, clinical support staff, and those in all other job categories were *less likely* to report being both willing and able to report to work (Table 5).

TABLE 4. Ability and willingness (able, not able, or not sure) by event type

	Snow 36'' [n (%)]	Smallpox [n (%)]	Chemical [n (%)]	MCI—explosion [n (%)]	Environmental [n (%)]	Radiation [n (%)]	SARS [n (%)]
Ability							
Able	2,963 (48.9)	4,077 (68.6)	4,216 (71.0)	4,924 (82.5)	4,825 (80.6)	3,807 (63.8)	2,624 (63.5)
Not sure	1,720 (28.4)	1,233 (20.7)	1,105 (18.6)	677 (11.3)	756 (12.6)	1,396 (23.4)	961 (23.3)
Not able	1,375 (22.7)	637 (10.7)	616 (10.4)	366 (6.1)	403 (6.7)	764 (12.8)	546 (13.2)
Willingness							
Willing	4,548 (80.4)	3,447 (61.1)	3,853 (67.7)	4,868 (85.7)	4,767 (84.2)	3,263 (57.3)	1,946 (48.4)
Not sure	611 (10.8)	1,327 (23.5)	1,081 (19.0)	496 (8.7)	565 (10.0)	1,419 (24.9)	1,200 (29.9)
Not willing	496 (8.8)	871 (15.4)	759 (13.3)	313 (5.5)	332 (5.9)	1,010 (17.7)	871 (21.7)

MCI, mass casualty incident; SARS, sudden acute respiratory distress syndrome. For some categories, percentages do not add up to 100% due to rounding.

TABLE 5. Logistic regression: ability and willingness by individual factors and occupational groups

	Odds ratio	95% confidence interval	P
Model 1. Individual factors for ability to report to work			
Gender: female	0.545	4.480–0.613	.000
Age <45	—	—	n.s.
Child care: no obligations	1.355	1.218–1.507	.000
Eldercare: no obligations	1.255	1.111–1.417	.000
Model 2. Individual factors for willingness to report to work			
Gender: female	0.467	0.412–0.529	.000
Age <45	0.654	0.585–0.731	.000
Child care: no obligations	1.140	1.021–1.272	.019
Eldercare: no obligations	1.166	1.028–1.322	.017
Model 3. Overall ability for occupational groups (reference category physicians)			
Administrator	0.595	0.472–0.750	.000
Clinical support	0.465	0.372–0.580	.000
Nurse	0.519	0.413–0.653	.000
Other occupational groups	0.442	0.351–0.556	.000
Emergency medical technician—paramedic	—	—	n.s.
Model 4. Overall willingness for occupational groups (reference category physicians)			
Administrator	0.781	0.617–0.988	.039
Clinical support	0.658	0.525–0.825	.000
Nurse	0.652	0.517–0.822	.000
Other occupational groups	0.574	0.455–0.725	.000
Emergency medical technician—paramedic	—	—	n.s.

DISCUSSION

We found that employees’ ability and willingness to report to duty varied by event type. We also noted that, in general, the barriers to ability and willingness differed. This supports our hypothesis that ability and willingness are indeed two different constructs.

For example, the most frequently cited reasons for *not being able* to report to work during a catastrophic event were transportation issues, childcare and eldercare responsibilities, personal health concerns, and pet care obligations, whereas the most frequently cited reasons for *not being willing* to report to work during such an event were fear and concern for family and fear and concern for self. The reported reasons for being unable and unwilling and the incidence for each were consistent across all facility types.

It is interesting to note that ability and willingness were reported to be lowest for those types of events in which employees are more likely to perceive the highest degree of risk to themselves or their family (smallpox, chemical, radiation, and SARS). This finding is consistent with that of Shapira et al.⁶ who similarly found that employees reported willingness increased with the provision of adequate personal protection equipment (PPE). Our results are also similar to findings in a

school nurse study, which found that willingness to provide care for patients during biological events such as smallpox, SARS, or other deadly illnesses was generally low, with one third reporting that they had received little or no training on the use of PPE in such events.⁹

The findings from this study provide us with an opportunity to enhance HCWs' ability and willingness to respond by addressing those barriers which are amenable to intervention. For instance, transportation barriers can be addressed in a variety of ways—pools of employees who have four-wheel drive vehicles can be formed, with pick-up points situated along major roads that are likely to be open or cleared of snow or debris. Facilities could also arrange with local emergency management officials to provide transportation for essential personnel. Another strategy might include using proximity of personnel residence to the workplace as a factor in selection of new hires. Anecdotally, hospitals that have a large percentage of employees who live near their hospital have fewer problems with staffing during weather events.

Health care facilities can also provide support to employees with childcare and eldercare obligations that might affect their ability to report to work in a number of ways. Preplanning for the formation of emergency childcare or eldercare centers that are either on or off-site can help address this. Another, less costly strategy might involve facilitating the formation of emergency childcare/eldercare pools, with staff scheduled in such a way that sharing these responsibilities is possible. This method might be preferable to some employees, as HCWs may be more likely to leave their children or elders in custody with people that they already know and trust. Additionally, some employees might be reluctant to leave children or elders in a facility that is in proximity to an event, and care provided by coworkers in a home setting could address this.

A sizeable number of HCWs reported that personal health issues were a barrier to their ability to report to work. This might be related to the need for medication at scheduled intervals. Employers can help address this potential barrier in several ways. Employees can be encouraged to maintain an emergency supply of medication at work, and chronic illness prescriptions can be noted in individual employee health records so that during an event, medications can be provided. Policies and procedures for such activities should, of course, be in place before a disaster occurs.

Pet care, another potential barrier for HCWs, is also amenable to preplanning. Employees should be encouraged to consider this obligation and to make provisions for pet care before a disaster occurs. As with child care or eldercare, strategies might include accommodation of schedules so that employees can share pet care responsibilities among themselves. Alternatives could include making arrangements, perhaps facilitated by the health care facility, with local veterinarians or animal shelters for emergency pet care. The Association for Prevention of Cruelty to Animals provides suggestions for disaster preparedness planning for pets.¹⁰

The most frequently cited reason for employees' unwillingness to report to duty during a disaster was fear and concern for the safety of their families and themselves. During a catastrophic event, employers must recognize that their HCWs are likely to be as (or even more) concerned than the average citizen, because they might have a greater understanding of the associated risks. SARS-related fatalities among HCWs' occupationally exposed and infected serves to highlight the basis of employees' fears regarding potentially fatal infectious diseases.³ Such fears, however, may, to some extent, also be amenable to intervention. Probably, the most effective methods to allay fears and concerns for personal safety revolve around HCW education, provision of appropriate PPE, and assurance of effective environmental

controls.¹¹ The findings of Shapira et al. support this idea that provision of appropriate PPE can serve to facilitate HCWs willingness to report to duty during a WMD event,⁶ and all HCWs should receive ongoing training with regards to WMD and dangerous emerging pathogens.

The facility's preparedness plans should be described to employees *before* a disaster strikes, and the protective programs that the employer has in place should be clearly communicated. Further, an effective employee assistance program can be especially helpful during a disaster. For example, during *Hurricane Alison* in 2001, the hospital employee assistance program at Texas Medical Center provided its staff with numerous services, including provision of emergency funds and critical home supplies, crisis counseling, and social support groups.¹² These actions sent a powerful message to employees, and this served to facilitate the HCWs ability and willingness to report to duty.

The interesting finding that HCWs married to first responders are both more able and willing to report to duty might be explained by the fact that these types of households are probably more likely to be aware of the necessity for workplace personal emergency planning. This finding reinforces the importance of this issue for all personnel; it should be discussed upon hire, reviewed annually, and include the following: emergency contact information, identification of care givers for children, elders and pets and how to contact them, personal medication list, and any other essential information needed if the HCW has to report to duty or stay at work during a disaster. Presence of a workplace personal emergency plan should be noted on annual employee performance appraisals. In addition, each HCW should have in place a family emergency plan that outlines how the family will operate during an emergency event. Examples of family emergency plans are available from Federal Emergency Management Agency and the American Red Cross.^{13,14}

There are a number of limitations to this study that need to be discussed. For example, since we only surveyed northeastern HCWs from one city and its surrounding region, these findings may not be generalizable to HCW populations in other geographic areas. Nevertheless, since the demographic profile of our sample is similar to GNYHA's member employees as a whole, and to available national statistics, we are confident that the sample is fairly representative in terms of demographics. Because HCWs in NYC may have a heightened awareness of disaster preparedness given the WTC disaster and subsequent anthrax attacks, their responses may vary from HCWs from other regions. Additional studies would help to clarify this. Another issue that needs to be noted is that we have no information about the nonresponders and must consider responder bias in these findings. Finally, the ultimate question is whether HCWs will actually respond to a WMD in the way they have indicated that they will. This, of course, can only be answered if and when an actual event occurs.

Despite these limitations, these findings demonstrate that there are differences in HCWs ability and willingness to report to duty during different catastrophic disaster events, and barriers to ability and willingness exist. We feel that most identified barriers are amenable to intervention through effective pre-planning. Each of the facilities that participated in this project received a report of the findings that illustrated the data for their specific facility as well as the findings for the entire sample. This enabled the facilities to benchmark their responses and to identify common barriers for their employees. The results were also presented at a GNYHA meeting which also included a discussion about

ways that organizations can pool resources to address these barriers. The facilities noted that they would use this information for preplanning so that they could enhance the ability and willingness of their HCWs to report to duty during catastrophic disaster events.

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